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ARTICLES

An examination of Domin's missing grass types

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Introduction

In 1991 Terry Macfarlane reported the discovery of three unincorporated bundles of grass specimens in the Domin Herbarium of the National Museum in Prague (PR), during his term as Australian Botanical Liaison Officer at Kew. Examination of this material, sent to Hubbard at Kew by Karel Domin in the early 1930's and returned in early 1970 (Macfarlane, 1991), revealed them to consist of more than one hundred specimens, mostly collected by Domin in Australia in 1909–1910, and comprising most of the grass type material reported by me as difficult to locate (Simon, 1987). The reason that the specimens had been reported as "lost" was that there was no indication on the outside the bundle that the specimens were grasses; they were finally discovered on a shelf at the back of the Domin herbarium during Terry Macfarlane's visit to Prague.

The types

Following Macfarlane's suggestion, I requested a loan of this material from Prague, and I am now able to report on its contents. A total of 303 sheets were received at BRI, and all were mounted and appeared to have been so for some time, despite being reported by Macfarlane as all being unmounted. Included in the loan were 20 sheets with the Domin *Iter Australiense* number, PR sheet number and PR accession stamp, although the material seen by Macfarlane lacked these numbers.

On their arrival at BRI, the loans officer assigned a number in pencil to every sheet. When I examined the specimens, I listed the entire collection according to these numbers, and then appended them to a list that Macfarlane had compiled at Prague and sent to me separately. From this modified Macfarlane list I extracted a list of all of the type material (Table 1).

For each of the type specimens I have noted four features that may be of interest to researchers working on these genera:-

1. Basionym.
2. Currently accepted name.
3. Determined by — name and date.
4. Specimen number assigned at BRI.

Most of the names were first published in Domin's *Beitrage zur Flora und Pflanzegeographie Australiens* (1915), and most of the specimens were collected by him. A few specimens in the collection, however, were collected by other people (19 by Amalia Dietrich), and there are a few old duplicates from BRI (probably via K) collected by C.T. White and E.W. Bick.

As mentioned by Macfarlane, while the specimens were in Hubbard's care at Kew they were examined and annotated by several botanists working on Australian grasses. These include:- Hubbard himself (1933), W. Hartley (1939–1940), N.T. Burbidge (1940), J. Vickery (1948), S.T. Blake (1964), M. Lazarides (1966), and D.E. Anderson (1968). Some determinavit slips with the information "Kew" and a date, and cited by Macfarlane as "Anonymous, Herb. Kew, Jan 1970", are in the handwriting of Steve Renvoize (S.A. Renvoize), the present curator of the Kew grass collection. Where there was a need for an update of the currently-accepted name from the name on the specimen, I have attached a new determinavit slip to the material. Also, while I was examining the Domin material, Maggie Sutton (CANB) was at BRI working on some chloridoid genera for the *Flora of Australia*, and she was able to attach det slips where appropriate.

The reason for the inclusion in the loan of material from the main Domin herbarium is not quite clear, as they were not requested. However, they include some Andropogoneae type material, and I would have required to see them at some stage in relation to my *Flora of Australia* Andropogoneae studies. I had previously examined one of these specimens on loan to K in 1986.

All of the type material has been photographed for incorporation into the BRI grass type collection. Copies of prints of all chloridoid genera have been sent to CANB. I also have a complete list of all of

the material borrowed from Prague, should anyone require to see it.

Table 1. Domin Types on Loan to Queensland Herbarium (BRI) from Prague (PR) in 1992

Basionym: *Andropogon annulatus* var. *grandispiculatus* Domin
Current accepted name: *Dichanthium fecundum* S.T. Blake
Det.: S.T. Blake
No. of Specimens: 1 (BRI 183); holotype, photo BRI

Basionym: *Andropogon decipiens* var. *cloncurrensis* Domin
Current accepted name: *Bothriochloa decipiens* var. *cloncurrensis* Domin
Det.: Herb. Kew (S.A. Renvoize) 1970, B.K. Simon 1992
No. of Specimens: 1 (BRI 184); holotype, photo BRI

Basionym: *Andropogon ewartianus* Domin
Current accepted name: *Bothriochloa ewartiana* (Domin) C.E. Hubb.
Det.: Herb. Kew (S.A. Renvoize) 1970, B.K. Simon 1992
No. of Specimens: 1 (BRI 142); holotype, photo BRI
Notes: Notes by Domin in Latin

Basionym: *Andropogon nardus* var. *australiensis* Domin
Current accepted name: *Cymbopogon queenslandicus* S.T. Blake
Det.: S.T. Blake 1964, B.K. Simon 1992
No. of Specimens: 3 (BRI 51-53); syntypes, photos BRI

Basionym: *Andropogon refractus* var. *tropicus* Domin
Current accepted name: *Cymbopogon refractus* (R.Br.) A. Camus
Det.: C.E. Hubbard 1933, S.T. Blake 1964, B.K. Simon 1992
No. of Specimens: 1 (BRI 8); holotype, photo BRI

Basionym: *Andropogon refractus* var. *luxurians* Domin
Current accepted name: *Cymbopogon refractus* (R.Br.) A. Camus
Det.: C.E. Hubbard 1933, S.T. Blake 1964, B.K. Simon 1992
No. of Specimens: 1 (BRI 9); holotype, photo BRI

Basionym: *Andropogon refractus* f. *euryphyllus* Domin
Current accepted name: *Cymbopogon refractus* (R.Br.) A. Camus
Det.: Kew (S.A. Renvoize) 1970
No. of Specimens: 1 (BRI 141); holotype, photo BRI

Basionym: *Andropogon sericeus* f. *ciliatus* Domin
Current accepted name: *Dichanthium sericeum* (R.Br.) A. Camus ssp. *sericeum*
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 145); holotype, photo BRI

Basionym: *Andropogon sericeus* f. *glaberrimus* Domin
Current accepted name: *Dichanthium sericeum* (R.Br.) A. Camus ssp. *sericeum*
Det.: S.T. Blake
No. of Specimens: 2 (BRI 143-144); syhtypes, photos BRI
Notes: Admixture of *Sporobolus*

Basionym: *Andropogon sericeus* f. *micranthus* Domin
Current accepted name: *Dichanthium sericeum* (R.Br.) A. Camus ssp. *humilius* (J. Black) B. Simon
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 147); holotype, photo BRI

Basionym: *Andropogon sericeus* f. *puberulus* Domin
Current accepted name: *Dichanthium sericeum* (R.Br.) A. Camus ssp. *sericeum*
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 149); holotype, photo BRI

Basionym: *Chloris gabrielae* Domin
Current accepted name: *Chloris virgata* Sw.
Det.: B.K. Simon 1992, after Lazarides 1972
No. of Specimens: 2 (BRI 302-303); holotype (2 sheets): photos BRI, CANB
Notes: With ms. notes by Domin

Basionym: *Chloris pectinata* var. *fallax* Domin
Current accepted name: *Chloris pectinata* Benth.
Det.: D.E. Anderson, n.d., B.K. Simon 1992, after Lazarides 1972
No. of Specimens: 2 (BRI 294-295); lectotype (Hughenden), syntype (Winton) photos BRI, CANB

Basionym: *Chloris ruderalis* Domin (specimen No.2)
Current accepted name: *Chloris pumilio* R.Br.
Det.: M. Lazarides 1966, D.E. Anderson 1968
No. of Specimens: 1 (BRI 297); syntype, photos BRI, CANB
Notes: A mixed gathering of taxa on this sheet:
1. *Brachyachne convergens* (F. Muell.) Stapf
2. and 3. *Chloris pumilio* R.Br.
4. *Chloris lobata* Lazarides

Basionym: *Chloris ruderalis* Domin
Current accepted name: *Chloris pumilio* R.Br.
Det.: M. Lazarides 1966, D.E. Anderson 1968
No. of Specimens: 3 (BRI 297 298 301); syntypes, photos BRI, CANB

Basionym: *Dactyloctenium radulans* var. *aristiglume* Domin
Current accepted name: *Dactyloctenium radulans* P. Beauv.
Det.: B.K. Simon & M.E. Sutton 1992
No. of Specimens: 3 (BRI 107 117 118); syntypes, photos BRI, CANB

Basionym: *Dactyloctenium radulans* var. *conglobatum* Domin
Current accepted name: *Dactyloctenium radulans* P. Beauv.
Det.: B.K. Simon & M.E. Sutton 1992
No. of Specimens: 1 (BRI 106); holotype, photos BRI, CANB

Basionym: *Diplachne loliiformis* var. *longearistata* Domin
Current accepted name: *Tripogon loliiformis* (F. Muell.) C.E. Hubb.
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 192); holotype, photos BRI, CANB

Basionym: *Diplachne loliiformis* var. *plumosa* Domin
Current accepted name: *Tripogon loliiformis* (F. Muell.) C.E. Hubb.
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 191); holotype, photos BRI, CANB

Basionym: *Ectrosia danesii* Domin
Current accepted name: *Ectrosia danesii* Domin
Det.: S.T. Blake 1964, M.E. Sutton 1992
No. of Specimens: 1 (BRI 281); holotype, photos BRI, CANB
Notes: Kew negative 11476. Collected by D.J. Danes from Normanton

Basionym: *Ectrosia eragrostoides* Domin
Current accepted name: *Ectrosia lasioclada* S.T. Blake
Det.: M.E. Sutton 1992
No. of Specimens: 1 (BRI 282); holotype, photos BRI, CANB
Notes: Kew negative 11477. With sketches and notes by Domin

Basionym: *Ectrosia squarrulosa* Domin
Current accepted name: *Ectrosia gulliveri* F. Muell.
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 155); holotype, photos BRI, CANB
Notes: With notes and drawings by Domin.

Basionym: *Eriachne gracilescens* Domin
Current accepted name: *Eriachne ciliata* R.Br
Det.: W. Hartley 1939
No. of Specimens: 1 (BRI 278); holotype, photos BRI, CANB

Basionym: *Eriachne insularis* Domin
Latest Det.: *Eriachne insularis* Domin
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 270); holotype, photos, BRI, CANB

Basionym: *Eriachne mucronata* var. *villiculmis* Domin
Current accepted name: *Eriachne mucronata* R.Br.
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 255); holotype, photos BRI, CANB

Basionym: *Eriachne mucronata* var. *glabrifolia* Domin
Current accepted name: *Eriachne mucronata* R.Br.
Det.: B.K. Simon 1992
No. of Specimens: 5 (BRI 258-261 263); syntypes, photos BRI, CANB

Basionym: *Eriachne mucronata* var. *bimucronata* Domin
Current accepted name: *Eriachne mucronata* R.Br.
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 264); holotype: photos BRI, CANB

Basionym: *Eriachne mucronata* var. *elongata* Domin
Current accepted name: *Eriachne mucronata* R.Br.

(intermediate form)
Det.: M. Lazarides, 1966
No. of Specimens: 1 (BRI 257); holotype, photos BRI, CANB

Basionym: *Eriachne obtusa* var. *glauca*
Current accepted name: *Eriachne obtusa* R.Br.
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 273); holotype, photos BRI, CANB

Basionym: *Eriachne triodiodes* Domin
Current accepted name: *Eriachne triodioides* Domin
Det.: M. Lazarides 1966
No. of Specimens: 1 (BRI 275); holotype, photos BRI, CANB

Basionym: *Eriachne yarrabensis* Domin
Current accepted name: *Eriachne pallescens* R.Br.
Det.: W. Hartley 1939, Kew (S.A. Renvoize) 1969
No. of Specimens: 2 (BRI 266, 268); holotype (2 sheets):photos BRI, CANB

Basionym: *Ischaemum australe* var. *semivestitum* Domin
Current accepted name: *Ischaemum australe* var. *villosum* (R.Br.) Benth.
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 65); holotype: photo BRI

Basionym: *Ischaemum striatum* var. *stenophyllum* Domin
Current accepted name: *Sehima nervosum* (Rottler) Stapf
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 79); holotype: photo BRI

Basionym: *Lepturus xerophilus* Domin
Current accepted name: *Lepturus xerophilus* Domin
Det.: M. Sutton 1992
No. of Specimens: 1 (BRI 78); syntype, photo BRI, CANB
Notes: "Bluff" syntype

Basionym: *Lepturus xerophilus* Domin
Current accepted name: *Lepturus xerophilus* Domin
Det.: M. Sutton 1992
No. of Specimens: 1 (BRI 124); syntype, photo BRI, CANB
Notes: Boonmoo syntype

Basionym: *Ophiuros pubescens* Domin
Current accepted name: *Thaumastochloa pubescens* (Benth) C.E. Hubbard
Det.: B.K. Simon 1992, after Koning, Sosef & Veldkamp 1983
No. of specimens: 1 (BRI 64); holotype, photo, BRI
Notes: The correct basionym is *Ophiurus corymbosus* var. ? *pubescens* Benth. The qustion mark does not invalidate publication of the name *pubescens*

Basionym: *Pappophorum avenaceum* var. *nanum* Domin
Current accepted name: *Enneapogon avenaceus* (Lindley) C.E. Hubb.
Det.: B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 1 (BRI 231); holotype, photo BRI

Basionym: *Pappophorum avenaceum* var. *typicum* Domin
Current accepted name: *Enneapogon avenaceus* (Lindley) C.E. Hubb.
Det.: B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 4 (BRI 232-235); syntypes, photos BRI, CANB
Notes: This name is a nomen nudum

Basionym: *Pappophorum lindleyanum* var. (*pubescens*) Domin
Current accepted name: *Enneapogon pubescens* (Domin) N. Burb.
Det.: B.K. Simon 1992, after Burbidge 1941
No. of Specimens: 1 (BRI 213); lectotype, photos BRI, CANB
Notes: As Burbidge found no specimen labelled *Pappophorum lindleyanum* var. *pubescens* in the Domin collection, she nominated this specimen, labelled var. *convolutum* by Domin, as the type of Domin's var. *pubescens* as it agrees with the description of the latter

Basionym: *Pappophorum lindleyanum* var. *convolutum* Domin
Current accepted name: *Enneapogon lindleyanus* (Domin) C.E. Hubb.
Det.: B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 3 (BRI 214-216); syntypes, photos BRI, CANB

Basionym: *Pappophorum lindleyanum* var. *glaucum* Domin
Current accepted name: *Enneapogon oblongus* N. Burb.
Det.: B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 1 (BRI 210); holotype, photos BRI, CANB

Basionym: *Pappophorum lindleyanum* var. *scaberrimum* Domin
Current accepted name: *Enneapogon pubescens* (Domin) N. Burb.
Det.: B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 2 (BRI 211-212); syntypes, photos BRI, CANB

Basionym: *Pappophorum nigricans* var. *glabrescens* Domin
Current accepted name: *Enneapogon intermedius* N. Burb.
Det.: N.T. Burbidge 1940, Kew (S.A. Renvoize) 1970, B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 3 (BRI 245-247); syntypes, photos BRI, CANB

Basionym: *Pappophorum nigricans* var. *pubiculme* Domin
Current accepted name: *Enneapogon pallidus* (R.Br.) P. Beauv.
Det.: B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 1 (BRI 248); holotype, photos BRI, CANB

Basionym: *Pappophorum nigricans* var. *robustissimum* Domin
Current accepted name: *Enneapogon robustissimus* (Domin) N. Burb.
Det.: B.K. Simon 1992, after Kakudidi *et al.* 1989
No. of Specimens: 1 (BRI 253); holotype, photos BRI, CANB

Basionym: *Pollinia argentea* var. *queenslandica* Domin
Current accepted name: *Eulalia trispicata* (Schultes) Henrard
Det.: B.K. Simon 1992
No. of Specimens: 2 (BRI 98-99); holotype (2 sheets), photos BRI
Notes: Sheet 2 has a piece of *Sowerbaea* attached

Basionym: *Pollinia fulva* var. *deserticola* Domin
Current accepted name: *Eulalia aurea* (Bory) Kunth
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 101); holotype, photo BRI

Basionym: *Pollinia fulva* var. *savannorum* Domin
Current accepted name: *Eulalia aurea* (Bory) Kunth
Det.: B.K. Simon 1992
No. of Specimens: 3 (BRI 102-104); holotype (3 sheets), photos BRI

Basionym: *Rottboellia compressa* var. *spathacea* Domin
Current accepted name: *Hemarthria uncinata* var. *spathacea* (Domin) Vick.
Det.: C.E. Hubbard 1934, B.K. Simon 1992
No. of Specimens: 1 (BRI 159); holotype, photo BRI

Basionym: *Rottboellia formosa* var. *pilosissima* Domin
Current accepted name: *Mnesithea formosa* (R.Br.) Koning & Sosef
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 158); holotype, photo BRI

Basionym: *Rottboellia formosa* f. *subglabra* Domin
Current accepted name: *Mnesithea formosa* (R.Br.) Koning & Sosef
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 156); holotype, photo BRI

Basionym: *Rottboellia ophiuroides* var. *vestita* Domin
Latest Det.: *Mnesithea rottboellioides* (R.Br.) Koning & Sosef
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 70); holotype, photo BRI

Basionym: *Sporobolus australasicus* Domin
Current accepted name: *Sporobolus australasicus* Domin
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 10); Lectotype of Baaijens & Veldkamp, photo BRI
Notes: K isolectotype of this collection selected by Baaijens and Veldkamp (1991), but this cannot stand as this collection is not cited in the protologue

Basionym: *Triodia hostilis* Domin
Current accepted name: *Triodia hostilis* Domin
Det.: B.K. Simon 1992

No. of Specimens: 1 (BRI 137); holotype, photos BRI, CANB

Basionym: *Triodia pungens* Domin f. *microstachya* Domin
Current accepted name: *Triodia pungens* Domin
Det.: S.T. Blake 1964
No. of Specimens: 1 (BRI 134); holotype, photos BRI, CANB

Basionym: *Triodia stenostachya* Domin
Current accepted name: *Triodia stenostachya* Domin
Det.: B.K. Simon 1992
No. of Specimens: 1 (BRI 139); holotype, photos BRI, CANB

Basionym: *Triodia vulnerans* Domin
Current accepted name: *Triodia pungens* Domin
Det.: S.T. Blake 1964, Kew (S.A.Renvoize) 1970
No. of Specimens: 2 (BRI 91-92); syntypes, photos BRI, CANB
Notes: Includes ms. notes

Types from main Domin herbarium included with loan

BRI 26 *Iseilema vaginiflorum* Domin — Hughenden. Domin 839. PR 524054. Syntype, photo BRI. Det B.K. Simon 1992
BRI 27 *Iseilema vaginiflorum* Domin — Hughenden. Domin 840. PR 524055. Syntype, photo BRI. Det B.K. Simon 1992
BRI 28 *Iseilema vaginiflorum* Domin — Hughenden. Domin 841. PR 524056. Syntype, photo BRI. Det B.K. Simon 1992
BRI 29 *Iseilema vaginiflorum* Domin — Hughenden. Domin 842. PR 524057. Syntype, photo BRI. Det B.K. Simon 1992
BRI 30 *Iseilema vaginiflorum* Domin — Hughenden. Domin 843. PR 524058. Lectotype Sheet 1, photo BRI. Det B.K. Simon 1992
BRI 31 *Iseilema vaginiflorum* Domin — Hughenden. Domin 844. PR 524059. Lectotype Sheet 2, photo BRI. Det B.K. Simon 1992
BRI 32 *Iseilema vaginiflorum* Domin — Hughenden. Domin 845. PR 524060. Syntype, photo BRI. Det B.K. Simon 1992
BRI 33 *Chrysopogon gryllus* subvar. *pilosus* Domin — Jericho. Domin 747. PR 523963. Holotype, photo BRI. Current accepted name: *Chysopogon fallax* S.T. Blake. Det. B.K. Simon, 1992
BRI 36 *Themeda triandra* subvar. *oligitricha* Domin — Yarraba. Domin 922. PR 524137. Holotype, photo BRI. Current accepted name: *Themeda triandra* Forsskal. Det B.K. Simon 1992
BRI 37 *Themeda triandra* subvar. *oligitricha* Domin — Yarraba. Domin 921. PR 524136. Holotype, photo BRI. Current accepted name: *Themeda triandra* Forsskal. Det B.K. Simon 1986
BRI 38 *Iseilema membranaceum* var. *trichopus* Domin — Hughenden. Domin 830. PR 24045. Holotype of *Iseilema ciliatum* C.E.Hubb., photo BRI. Conf. B.K. Simon, 1992
BRI 39 *Iseilema macratherum* Domin — Chillagoe. Domin 829. PR 524044. Holotype Sheet 1, photo BRI. Det B.K. Simon 1992
BRI 40 *Iseilema macratherum* Domin — Chillagoe. Domin 846. PR 524061. Holotype Sheet 2, photo BRI. Det B.K. Simon 1992
BRI 41 *Iseilema macratherum* Domin — Chillagoe. Domin 847. PR 524062. Holotype Sheet 3, photo BRI. Det B.K. Simon 1992

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Memories of some collecting trips in central Australia

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Introduction

During 1956 I read a book, *I Saw a Strange Land* (by Arthur Groom, 1950, Halstead Press). The author described, among many things, a *walking* trip along the George Gill Range in 1947. He mentioned the explorations of Giles (1872) and Gosse (1873) in this area, and I started reading about their trips, plus that of Tate with the Horn Expedition (1894). In the list of plants from these expeditions, I saw names which did not occur in the parts of central Australia where I had already collected. I wanted to re-collect these species.

The trips

In June 1956 I was accompanied in a Landrover by Len Reid (the father of a friend) who was on holidays in Alice Springs. Also, Neville Forde from CSIRO, went along in a separate vehicle. We camped at Angas Downs, and woke up in the rain — our swags were most effective. It rained all day while we drive to Tempe Downs homestead. The heavy rain, so untypical of central Australian weather, forced me to decide to turn back and not attempt to reach King Creek, which was at the western end of the George Gill Range. We were soon bogged, and camped the night in heavy rain, not being able to extricate ourselves till next morning. We drove back to Alice Springs, always fearful of being bogged in the road, which was often more like a string of pools.

At this time, Tempe Downs Station was owned by Joe O'Brien who, to my memory, did not have any vehicles on his property. The station was known as a "pack horse station". I heard he hired taxis to and from Alice Springs, when needed. Consequently, this Station was not covered by roads and tracks, as were all of the other Stations.

Some time after this aborted trip, a study was made by my assistant, John Kronenburg, of aerial mosaic photographs to establish a way for driving a vehicle through the terrain. This reconnaissance proved most effective in making the next trip.

Other work and commitments prevented any further attempt to get to the George Gill Range until the following year. On 11 August 1957, with my assistant John, I drove to the Tempe Downs area and camped in the Peterman Creek. Next morning, Joe Mahood, a Stock Inspector, joined us in another vehicle. We drove along the Levi Range to an area called McCrae's Yard where we camped.

Next day, the 13th, we drove along the George Gill Range to Bagot's Creek, then to Stokes' Creek, and camped at Kathleen Creek. During this day, among others, I collected *Eremophila strongylophylla* (now *E. ovata*), *Dicrastylis gilesii*, *Prostanthera striatiflora*, *Baeckea polystemonea*, *Acacia* sp. nov. (now *A. macdonnelliensis*), *Rulingia magniflora*, *Olearia ferresii*, and *Abutilon leucopetalum*. It was pleasing to collect these species, which were not common.

Next day, the 14th, we travelled slowly to Reedy Creek, which is now a declared aboriginal sacred site and not able to be visited, and finally to Kings Creek. Arthur Groom called it King's Canyon, having been told about it by Rex Battarbee, but I believe this to be an unofficial name, though certainly since adopted by the tourist industry. During this day at Kathleen Creek I collected the fern *Cyclosorus gongylodes* (now *C. interruptus*), such a rare plant to find in such an arid climate, but existing by growing on the southern side of the Range and being near a waterhole, clearly a relict species in this area. It was exciting to collect such a plant in this area. Also collected was *Helipterum thomsonii* (now *Ozothamnus thomsonii*), often called "eidelweiss" when seen at Standley Chasm, near Alice Springs, because of its habit of growing high on almost inaccessible rocks. At Reedy Creek was another fern rare for this area, *Adiantum hispidulum*, in a secluded rockhole near water. Other novelties included *Plectranthus intraterraneus* and *Potamogeton crispus*. *Hibbertia glaberrima*, a species found in other sheltered relict areas was also collected at Reedy Creek.

The following day (the 15th), was spent collecting in the King Creek area. *Macrozamia macdonnellii*, another relict species found at a few other sheltered places, was found, and also the very poisonous shrub, *Gastrolobium grandiflorum* (now *G. brevipes*). In a later trip, my assistant and friend, Des Nelson, recorded in his diary (26 June 1959): "*Gastrolobium* growing all around and a lot of horse and cattle skeletons". We camped at Bagot's Creek on the way back.

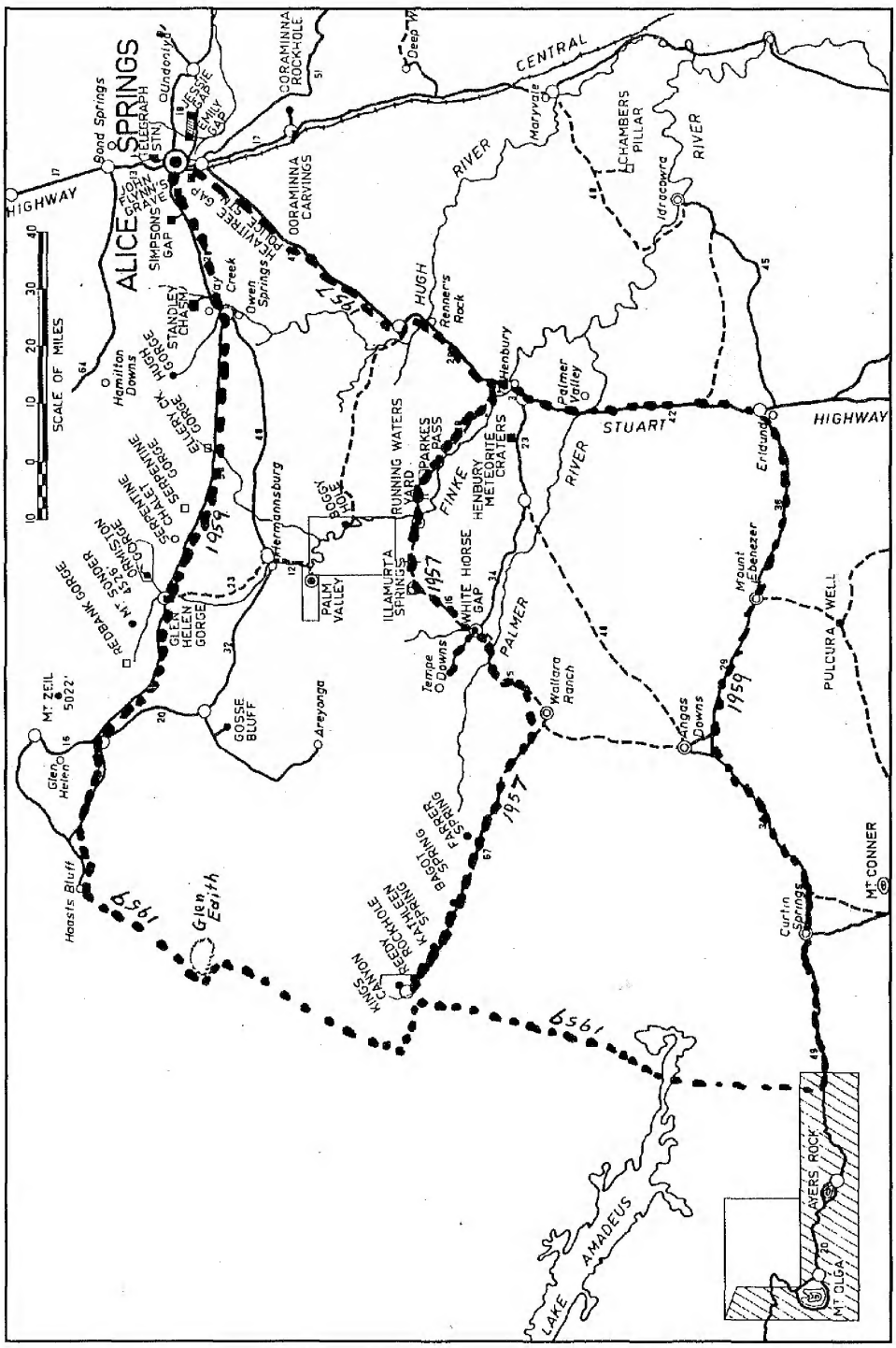

Figure 1. Map of the collecting trips in 1957 and 1959

On Friday 16th we drove back to Alice Springs, calling at Tempe Downs for a conversation with Mr and Mrs O'Brien, and also a radio conversation with Amaroo Station regarding a poisonous plant problem.

The next trip to King Creek took place in 1959, when I and Des Nelson departed Alice Springs, with a pedologist, Ted Jackson (CSIRO), and his wife Mary, in a separate vehicle. We first went to Haast Bluff and camped nearby. Then, next day (the 23rd) we drove south-west to Deering Creek, from which we drove further south-west to strike Glen Edith, where Ernest Giles had been in October 1872. Giles records that they luxuriated in finding good water here, as well as figs (*Ficus platypoda*). He called the waterhole the Tarn of Auber, after lines in a poem by Edgar Allan Poe which he quotes in *Australia Twice Traversed* (1889), and also "called this charming little oasis Glen Edith, after one of my nieces."

We were again driving without any roads, but with the use of aerial photo mosaics which had been studied by Des Nelson. We did not find any water, as it was a drought period. Common central Australian species were collected or noted, but we did collect the more uncommon *Spyridium spathulatum* (now *S. complicatum*), *Prostanthera baxteri*, *Jasminum calcarium*, and the strange *Brachysema* (now *Leptosema*) *chambersii* in surrounding sandy country. About 9 km south of Glen Edith was a colony of the grass tree *Xanthorrhoea thorntonii*, with the finely flowered *Thryptomene maisonneuvii* in undulating sandy country. As we proceeded southwards towards the George Gill Range, still without any tracks, we collected *Canthium lineare*, *Goodenia mueckeana*, *Acacia maitlandii*, *Jasminum lineare* (now *J. didymum* ssp. *lineare*), and *Eremophila exotrachys* (now *E. platythamnos*). After camping in the desert, we came into King Creek from the west on the next evening (the 25th). We saw the Desert Oak, *Casuarina decaisneana* (now *Allocasuarina decaisneana*) and the Desert Kurrajong, *Brachychiton gregorii*.

On the 26th I collected *Hannafordia bissellii* in the dry sandy bed of King Creek. At Reedy Creek, in a rock hole, was *Phragmites karka*. We drove along King Creek later that day, southwards towards Lake Amadeus, mostly seeing more common central Australian species, until on the following day (the 27th) at about 37 km southwards, I saw the Marble Gum, *Eucalyptus gongylocarpa*, which became more common as we proceeded; we collected buds, not previously described, of this species. Also in this area was *Eucalyptus* sp. nov. (later described as *E. mannensis*). We camped in the desert again. Next day (the 28th) I collected *Hibiscus pinonianus* (now *Alogyne pinoniana*), and we camped near the northern side of Lake Amadeus.

On the 29th, on sand ridges near the edge of the lake, which was dry and salt-encrusted, I collected *Corynotheca lateriflora*, *Dampiera cinerea*, *Plagianthus glomeratus* (now *Lawrencia glomerata*), *Frankenia cordata*, and other species tolerant of saline conditions. We drove across the lake later that day, finding it was somewhat soft in the middle, but with 4-wheel-drive the crossing of about 1.6 km was uneventful — although I am reminded by Des Nelson that we actually had to reverse and charge into our tracks seven times, when the going became somewhat soft. A pilot of Connellan's Airways reported seeing our tracks across the lake! Giles had recorded, again in *Australia Twice Traversed*, having his horses bogged on the lake edge somewhat near the spot where we crossed. He was there following very good seasons, and we were there in drought. After one more camp near Erldunda, we returned to Alice Springs on 1st July.

The overall impression of seeing the country at that time was of cleanliness, natural beauty, and excitement at finding these species which were not common in central Australia. Soon afterwards, other people who had heard of our trip made the journey to King Creek, and very soon there were tourist buses going there. Is it a good thing that botanical exploration led to the area being visited so much? Probably so, as such "progress" would have gone on anyway. Des Nelson visited the same areas in 1983, and has mentioned in a recent letter that he found the area "criss crossed by bulldozer tracks. They were oil exploration lines. I'm glad we saw the area in pristine condition." Des also mentioned that he again visited King Creek during 1991, and more recently his son-in-law has been involved in building elevated walkways, which I saw on a recent "Getaway" TV programme.

I was fortunate to have been able to visit these areas when I did. I recently read the Nancy Cato book *A Distant Island*, and felt in tune with the feelings and experiences she gave to Ronald Gunn, when he was botanically exploring in Tasmania and marvelling about each discovery. Nancy Cato also mentions a letter from William Archer to Gunn, saying: "Botany forever! With its wonderful and beautiful forms and its delightful associations. Politics are a necessary evil, however — but after the abuse and quarrelling of politics, Botany is a bed of roses."

Senecio lautus sensu lato — an unresolved complex

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Introduction

A workable subdivision of the exceedingly variable group of plants known in Australia and New Zealand as *Senecio lautus* Forster f. ex Willd. has not yet been resolved (Lawrence and Belcher, 1986).

The application of the subspecific epithets of Ali (1969) is neither easy nor satisfying, except perhaps his *S. lautus* ssp. *alpinus*.

Ali's inclusion of *S. spathulatus* A. Rich., illustrated in Carolin and Clarke (1991), as a synonym of his *S. lautus* ssp. *maritimus* was unfortunate. The former is a quite distinct taxon, probably including *S. anacampserotis* DC. I believe that the type of Ali's *S. lautus* ssp. *maritimus* may be either a distinct quite fleshy, often dwarf, coastal taxon (equivalent to *S. crithmifolius* A. Rich.), or part of a very variable group including *S. crithmifolius* and forms exemplified by the type of his *S. lautus* ssp. *dissectifolius* from the Victorian mallee. This larger group would then include plants extending from the coast in South Australia and south-western Victoria through the mallee regions of South Australia and Victoria to far south-western New South Wales. Possibly, some Tasmanian and Western Australian plants would fit here too. Many of these plants could be referred to *S. carnulentus* DC, which Belcher (1992) believes to be a synonym of *S. pinnatifolius* A. Rich.

Plants occurring away from the coast in parts of north-eastern New South Wales, with filiform leaf segments and presently often identified as *S. lautus* ssp. *dissectifolis*, may belong to another group.

Many plants occurring on the coast of New South Wales, and often given the name *S. lautus* ssp. *maritimus* (apart from those belonging to the African species *S. madagascarensis* Poiret — see Michael, 1991; Nelson and Michael, 1982), seem to be different from plants collected along the south-western Victorian coast and in South Australia. Plants collected from Coffs Harbour to Woolgoolga show many resemblances and similar variation to a range of specimens collected in 1989 and 1990 by Jennifer Marohasy of the Queensland Department of Lands in southern Madagascar. This suggests that further detailed study of *Senecio* from coastal southern Africa, especially of *S. skirrhodon* DC (already recorded for New Zealand — see Webb *et al.*, 1988), is required before the identity of some of our coastal plants can be clarified.

To some people, the ease with which plants from widely-separated areas of Australia and New Zealand have been crossed (Ali, 1964, 1966; Ornduff, 1964) has given little encouragement for further work on the complex. It must be noted, however, that the Australian plants used by Ali and Ornduff in their experiments were of quite restricted provenance, and that, in any case, geographical isolation is an important criterion for the separation of taxa.

It is vital for the understanding of such a complex that a wide co-operative attack should be made. Within Australia, state boundaries must be forgotten. Rather, we must concentrate on regions of similar geobotanical histories.

Belcher (1992) in his treatment of *S. australis* Willd. and *S. lautus* s. str. has emphasized the importance of the calycular bracts as taxonomic characters, and my brief inspection of these bracts in Australian material and in the closely-related African group of species *S. madagascarensis*, *S. inaequidens* DC and *S. skirrhodon* has pointed to their likely great use in further studies. I hasten to add, however, that proper attention must be given at the same time to other features.

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Using computers to save sanity

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Introduction

Late in 1990 I was given the task of producing a flora treatment for the group of *Acacia* species known as mulga, with the treatment to be ready for submission by the end of June 1991. There was provision for me to travel to other herbaria to examine material, but none for field work. Also, the travel grant was specifically described as replacing funding for loans between herbaria.

Although I have long had an interest in this group, I found the limits imposed on the task almost unbelievable. Previous taxonomic workers had dealt only with regional floras (e.g. Pedley, 1978; Maslin, 1980), while emphasising the amount of undescribed and unanalyzed morphological variation, and the taxonomic problems undoubtedly underlying it. The bulk of published work , as I already knew, was largely ecological, and of no direct relevance to the task.

Thus, any reasonable attempt to produce a taxonomy of the group would more nearly be considered as a revision (though based solely on herbarium materials) than as a flora treatment; and to encompass the task in a limit of six months seemed beyond me. However, as I had accepted the contract, I determined to do the best I could.

Thinking through the task, I decided that my main problem was that I would have to examine a large number of specimens in each herbarium, record information about them, and somehow store that information for at least several weeks, before moving on to another location and another large number of specimens — and then repeating the process at another location ... and another ... and another. Until I had seen (virtually) all of the specimens, I would not feel confident about taxon limits, and would certainly not be able to write descriptions covering the full range of the variation within each of them.

I was sure that my unaided memory would not be accurate enough to remember the full descriptions of the specimens in each herbarium, so that I could compare them with others in the next herbarium, and I would certainly have no time to re-visit any herbarium to check details within the six months. This meant assembling written descriptions of a wide sample of specimens in each herbarium, so that I could carry the descriptions with me. I forsaw writer's cramp in each herbarium I visited, and a huge pile of paper.

The solution

The idea soon grew that this was a case for computer power. If I could develop a system in which descriptions could be recorded quickly and efficiently, then I could describe more specimens during the limited time that I spent at each institution, could store the descriptions without necessarily sorting them into taxa, and would always have them available to check at later locations — and all this without building a huge stack of paper to carry with me. At that stage, I knew that completing the contract depended on having a portable computer on which to prepare a database of descriptions of specimens.

I then wondered what other uses a database of information might make available, besides the obvious ones of having a list of specimens, collec-

tors, dates, localities and descriptions. One of the problems mentioned by previous workers was the lack of correlation between characters of probable taxonomic use. Phyllodes in the group obviously vary in width, as do the "wings" on the fruit. However, no-one had been able to describe the correlation between the characters. I realized that if I had a database of information about the widths, lengths, and sizes of various organs on a number of specimens, then I could get the computer to produce graphs illustrating the relationships between pairs of characters — i.e. showing any correlations, and thus suggesting taxonomic usefulness. However, databases do not usually allow techniques such as graphing — that is restricted to spreadsheets. So, I would need database and spreadsheet programs that would talk to each other — in computer jargon, would be compatible.

I also realized that if I was finally able to build a separate database for each taxon, then I could quickly summarize the variation within each taxon — i.e. I had the outline of a taxon description already available. If my database was also compatible with my word-processor, then I could simply import this information into my final document without having to go through the tiresome process of typing it all in again.

So, I needed to find word-processing, database and spreadsheet programs that were all mutually compatible. It is possible to do this by buying individual programs, but it is much simpler to buy "integrated packages" — i.e. a package made up of programs that are designed to be compatible. Lotus makes such a package, but it is expensive and needs a powerful computer. Microsoft also makes a less-expensive package, which, though the individual programs are not the most powerful available, is sufficient for most needs. It will run on a basic computer, and is even cheaper with an academic discount. So I bought Microsoft "Works" for just over $100.

I also needed a portable computer. I eventually decided on an XT notebook model, which weighs only about 3 kilograms, and is small enough to fit into a briefcase. It has a hard disk drive (on which the program is loaded) and an external floppy disk drive, through which I made back-ups of the data each night, thus ensuring that I always had at least two copies of the data. It also means that, although the computer goes though the scanner at each airport (at least ten times to date, so far without damage to the information on the hard-disk), that the floppies are passed by hand around the scanner, and are not subjected to the possibility of damage. The battery in the computer will operate for about two hours without recharging (which is useful when in herbarium vaults), but the computer will also operate on mains power, and the battery will fully recharge overnight. (This was a very popular choice with my family, who insist that I take it home from work every night !)

Setting up the system

I am fortunate to be based in AD, which has a large collection of mulga specimens (c. 1200 sheets), so that I had a reasonable cross-section of the variation before me when I started work. My first task was to decide on the structure of my database — i.e. which characters would be essential in my record, and which would not be useful enough to be included. My first trial database contained c. 200 characters, most of which were faithfully recorded from a sample of c. 50 specimens.

I took this opportunity to check for correlations between characters represented by numbers, by importing the data into the spreadsheet and preparing graphs. In the event, I was not able to find any recognizable correlations, but my failure in this group of plants does not mean that success is impossible in other groups.

From this first database, it soon become apparent that a number of characters would not be useful for my purposes, because, for example, they showed no significant variation in my sample, or were so difficult or time-consuming to determine that they would not be suitable for a rapid study. So, the number of characters in my second database was much smaller than that in my first.

I then prepared the second, shorter database using label details (collector, locality, lat./long., herbarium, ecology, habit, etc.) and a variety of characters that I knew would be needed to prepare the final descriptions, and others that my first database had shown to be significantly variable. My work with the AD collection suggested that about 12 taxa might be recognised (several of these were later amalgamated), and I had a separate database for each taxon. These were the database files into which I loaded information at each of the herbaria that I visited. I also had another file in which I recorded very extensive descriptions of any/all type materials that I encountered.

On returning to AD, I was then able to look through the database for each taxon, and prepare a summary description of the variation for each character — e.g. I had recorded 'minimum phyllode width' and 'maximum phyllode width' for each specimen; by reading the lowest value for 'min.' and the highest value for 'max.', I had described

the width variation for all of my specimens. I now created a new database file and copied to it the summary statements for all of the taxa, and thus was able to compare the descriptions between taxa in very concise form. This was very helpful when it came to preparing keys.

The summary statements were then transferred to my word-processing program, and thus became the basis of the taxon description, ready for final editing and polishing. In addition, the label details for individual specimens, habit and ecological details were also available for importating into the report.

I did not use the lat./long. data for computer mapping, but that would also have been possible if I had used the appropriate mapping program.

A final bonus of the work is that copies of the database files are available for donation to other herbaria who may have a use for them. "Works" will save database files in "text & commas" or "text & tabs" format, for loading into other programs.

Using this setup enabled me to produce a revision of the group of species within the six months deadline. Although it can only be considered as a preliminary study, its results are certainly worthwhile. But the development of the computer method I count as one of the most important outcomes of the whole exercise.

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Selected Papers from the Database Developments and Data Sharing Workshop

Introduction

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On 1–2 August 1992, a workshop to discuss changes and future developments in database-design concepts was held at the National Herbarium of New South Wales, Royal Botanic Gardens, Sydney.

It was the first attempt in many years to deal with database design and data exchange issues across biological disciplines. Unfortunately, it was not possible for the invited participants from North America to attend. However, it was a good opportunity to be "catch up" on the many changes occurring in the databasing field within herbaria and museums.

The agenda for the Workshop included:-

• Herbaria and museums tend to have various distinct uses for data. These uses include: collection management, loans and exchange of collections, research, conservation, and exhibition planning. The design of databases to cater for all of these possible needs is highly complex.

• The rapid capturing of data from existing collections is frequently difficult for institutions to maintain, because of various constraints. However, institutions now have rapidly-expanding collections of electronic data. How well-planned is the management of these databases? What level of resources are required to maintain the integrity of the data?

• Duplicate specimens of plant collections frequently have the collector's field information from each specimen entered several times, each by the institution receiving the material. Attempts to overcome this duplication of effort have resulted in the development of data interchange standards. The need for, and usefulness of, these standards is probably best gauged by how frequently data are exchanged. What standards are available and who is using them?

• The use of images to electronically capture and store information will soon be a valid and economic addition to databases. This development raises a whole series of aspects that require discussion.

The Workshop included the following presentations:-

Des Beechy — "Overview of collection computerization throughout museums"
Mark McGrouther — "Databases at the Australian Museum, with discussion of the fish database"
Tracy Harwood — "Overview of the Australian National Insect Collection Database (ANIC)"
Tony Boston — "The ERIN Database — can it be a true distributed database?"
Ken Hill — "Database design for networking within the botanic gardens and herbaria"
Murray Ellis — "Development of a database for ecological information"
Ken Hill — "EUCALIST — a case study"
Arthur Chapman — "Data quality and validation"
Barry Conn — "The need for an international interchange standard — how international is HISPID?"
Chris Ward — "Living collections databases — implementation of ITF standards"
Nicholas Lander — "Exchanging taxonomic descriptive data"
Jim Croft — "An Australian taxon names database — a flexible standard"
Alex Chapman — "Species codes for herbaria — unique identifiers for names databases"
Arthur Chapman — "The Spatial Data Transfer Standard"

The need for an international interchange standard — How international is HISPID?

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Introduction

During the latter half of the 1980s, most Australian herbaria were either actively developing electronic Collection databases, or they already had established systems. It was soon realized that there was a need to ensure compatibility between these databases. Rather than emphasizing structural consistency between the databases (hence an Accession Standard), the need to establish a set of standards for the sharing of herbarium data (namely, an Interchange Standard) was agreed to by a committee of representatives from all major Australian herbaria.

In 1988, a short list of the kinds of data to be exchanged was prepared. By 1989, general agreement was reached on most of the standards of data to be included in each of the 105 possible data elements that had been compiled. The first working document that summarized the conclusions of the preceding discussions was compiled in 1990. Hence, the *Herbarium Information Standards and Protocols for Interchange of Data* (HISPID) was "official". Prior to the most recent discussions (in April 1992), a second version of the interchange standard was produced. The third version of HISPID is currently being edited, incorporating the conclusions of the 1992 discussions.

The success of HISPID as an interchange standard (within Australia) can be assessed in a number of ways.

Although the HISPID document does not deal with the type of Accession information to be included in a database, nor is it *intended* to influence the way that data are stored, it *has* influenced database development. Clearly, it is easier to exchange data if the data do not have to be manipulated before or after transfer. Therefore, there has been a tendency for the databases within Australian herbaria to be more consistent than might have been the case if HISPID had not existed. Since the development of HISPID has been a committee-based process involving all of the major Australian herbaria, all of these participants in the process are very familiar with the structure and philosophy behind the various herbarium databases. This very awareness has made it easier to develop an interchange standard.

Finally, HISPID has been successful because it is regularly reviewed and revised. Unlike some other standards, for example ITF, that have not been reviewed since publication, HISPID has been able to responded to changing technology and concepts. All of the above reasons, together with the

relatively large number of data elements included in the standard, make it worthy of consideration as an international data interchange standard.

Problems within the HISPID document that will need to be resolved

There are several categories of Interchange data within HISPID, ranging from *Mandatory*, *Desirable*, *Optional*, to *NO* (not for interchange). Apparent anomalies occur in data elements that are classified in the first three categories. The definitions of these first three categories are given as:-

"*Mandatory* implies that a field must be filled with meaningful data in the interchange record."

"*Desirable* implies that a field should contain meaningful data if at all possible in the interchange record (i.e. if the data exists) or be represented by a suitable null value."

"*Optional* implies that a field can be filled with data at the discretion of each herbarium or be represented by a suitable null record. The basic tenet is: if you have it, we would like it."

Only seven data elements (out of the 105 possible) are classified as mandatory:- Record Type (identifying number), Institution, Unique specimen identifier, Specimen accession number, Locality, Primary Collector's Name(s), and Collector's Field Number. However, only three herbaria have included the "Institution" field in their interchange format (by actually including this field in their databases). Although this data element can be generated and added at the time of transfer, HISPID does not reflect such an agreement with the other herbaria.

Of the many data elements that are classified as "Desirable" for interchange, several in the "Taxon Identification" group would appear to be more appropriately classified as "Mandatory" for interchange. These include:- Family name, Genus name, Species name, and Infra Species name. Although it is possible to imagine requests for data that would not require these taxon name fields (e.g. re-construction of a Collector's journeys without concern for the taxa collected), it seems likely that taxon-based requests would be common. Likewise, although the Collector's Names(s) and Collector's Field number are Mandatory, the "Date of Collection" is only a "Desirable" category. This would appear to be contrary to normal taxonomic requirements.

Finally, several data elements within the "Location" group require consideration. Only one (Locality) of the 25 data elements are considered "Mandatory" for interchange. This field "should be entered as far as possible as it is on the label, i.e. as raw data" (HISPID, April 1992, p. 43). Although all herbaria record this data element, it is not consistently recorded as defined above. Furthermore, only subsets of the herbaria record the other related data elements (i.e. Country, State or province, District or region). An example when relevant data might not be recorded occurs with some old collections that lack Country and/or State information. Therefore, if the information relevant to the "Locality" data element was recorded as an accurate copy of the herbarium label, the country and/or state data would not be included in the database.

The importance of geocode information has not been adequately dealt with by HISPID. Latitude, longitude and altitude have been classified only as "Desirable" or "Optional". "Precision" [Accuracy] of geocodes and altitude (to be included in HISPID version 3) are only "Optional" for interchange. Although other aspects related to geocode information were discussed at the last HISPID meeting, further review of these data elements will be necessary. In particular, the geocode information must satisfy the U.S. Spatial Data Transfer Standard, which has been adopted, with some modifications, by Australia and New Zealand.

Apart from the above specific suggestions, the general format of the HISPID document appears not to be as useful as it was. It is here suggested that the document be re-organized into the following three sections:-

1) *Data Exchange* — an interchange format for HISPID standard herbarium data based on the ASN.1 standard (as presented by S. Callahan at the last HISPID Workshop and accepted by the participants);
(2) *Data Dictionary* — definitions of the information to be interchanged;
(3) *Data elements stored in Australian herbaria* — a list of the data elements stored in each Australian herbarium's database (similar to the April 1992 version of HISPID pp. 9-12).

Conclusion

Irrespective of the problems, of which a few have been discussed here, HISPID has been successful. This is largely due to the willingness of the Australian herbaria to develop an interchange standard. However, the development of this standard has not been without difficulty. Institutional priorities, partly determined or influenced by State political or historical differences, have often made it difficult to reach a concensus.

It is probably fair to note that there has been a

positive change in attitude at each subsequent HISPID meeting, as the perception of databases has changed from one of a herbarium-label-generating device (the expensive typewriter!) to a Collection-information-management system. But more importantly, herbaria now perceive a need to share data. The ability to share data for scientific purposes is obvious to all scientists, but the economic and curatorial benefits of sharing data are now being accepted by a much wider group.

The integration of collection databasing into the curatorial process has possibly been the first and most significant change to curatorial practices since herbaria were established. In Australia, this change has occurred within the last five to seven years. Even though thousands of herbarium specimens are exchanged internationally, Australian herbaria have not seriously considered HISPID as relevant beyond the national context. But, it would appear to be the next logical application of this standard.

The Australian Museum ichthyology databases — a national perspective

Mark McGrouther
Australian Museum
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Sydney, NSW 2000

Introduction

The process of databasing the Australian Museum Ichthyology Collection began in 1979. At that time, staff stopped entering data into the old registers and began to write data onto computer sheets. Over the next 8 years, data were stored in several different systems off site. In 1987, the Museum purchased a Unison D21 computer, onto which the existing data were loaded, and manual entry of data by staff was commenced. In 1989, an Intel 302 (386) was purchased, and the entry of raw data was completed. At present, all of the raw data have been databased for the mammal, bird, reptile, fish and crustacea collections, a total of approximately 400,000 records. The Museum now uses three 386 computers for collection databasing, on which are stored 42 separate databases.

The databases

The Fish Section has 14 databases, the major ones being station (stn), lot, fishloanto (fishlt) and fishloan. The station database (59,823 records) stores information concerning the place, date, collector, time and other details about the collection. Information from the station database is automatically displayed in the lot database (111,776 records), which stores data pertaining to the specimens. From these two databases the majority of collection interrogation and maintenance functions can be performed. For example, wet labels for specimens, small larval fish labels, and registration sheets are all generated from the lot database.

The fishlt database (1,693 records) records details about the people who borrow specimens, including their address (which is copied from an address database), the loan period, method of shipment, etc. This is displayed in the fishloan database (8,234 records), which records the specimens on loan, the details being extracted from the lot database. The fishloan database is used to generate three-part pre-printed loan forms, wet loan labels, and other paperwork necessary for the transaction.

This is all achieved under Xenix using Titan, a database package developed initially at Melbourne University in 1983. Titan is designed to handle massive databases, and it is particularly suited to information from the middle to the free-text end of the information spectrum. Titan is currently used in over 100 Australian sites, for databases ranging from a few hundred to millions of records. Some examples of larger databases include:- the Melbourne White Pages (8 million records), the Victorian Births, Deaths and Marriages Register (1 million records), and the Melbourne Metropolitan Police number plate register (1 million records).

It's phenomenal speed results from the unique indexing system, which is described by Sacks-Davis & Ramamohanarao (1983). Basically, for a Titan data file there are two indexes. The first (rec) is a standard index where one data record is described by one descriptor. The second (seg) describes segments of the data file containing many records. When a query is performed, the segment index is searched first, and only matching segments

have their record descriptors (rec) searched. Using this system, an average query of 1% of the data file requires a search of only 6–10% of the database rather than the entire index using conventional indexing techniques.

Titan is the preferred database system for the majority of the major Fish Collections around the country (Table 1).

In 1985, a concensus was reached by representatives from the major Australian Fish Sections to standardize data formats, thereby facilitating data transfer. In practice, however, data are almost never shared, and as such, no formal data interchange standards have been developed. The major reasons for this are that:- joint collections are only made infrequently, and so data sharing is not necessary; and our primary customers are scientists, who have traditionally approached the institutions separately.

The Australian Museum is currently investigating the use of imaging. Facilities now exist for the plotting of distribution maps using "Mapinfo" or "ERMS". The ability to store images of specimens is currently available using Titan, as either a file or via a videodisc. Several other DOS-based options are being investigated.

Interest has arisen recently in a DOS database package called "Dataease". The majority of new databases in the Museum are developed on Dataease, after the completion of a detailed systems analysis. The Museum now has an efficient LAN with Dataease access. Eventually it is foreseen that Dataease will act as a front end to SQL for many Museum databases.

Table 1. Major Australian fish collections and the software that they use

Institution	Software
Australian Museum, Sydney	Titan
Northern Territory Museum	Titan
Museum of Victoria	Titan
South Australian Museum	Titan
CSIRO Fisheries, Hobart	Titan
Queensland Museum	RBase
Tasmanian Museum	—
Western Australian Museum	Ingress

Despite the form that the data takes and the software being used, the primary aim of having the collections databased is to make the information readily accessible for supply to our customers (both internal and external), thereby achieving the Museum's mission statement.

Reference

Sacks-Davis, R. and Ramamohanarao, K. (1983) A two-level superimposed coding scheme for partial match retrieval. *Inform. Systems* **8(4)**: 273-280.

Towards ecological databases for a conservation organization

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NSW National Parkes and Wildlife Service
PO Box 1967
Hurstville, NSW 2220

Introduction

The National Parks and Wildlife Service of New South Wales has conducted numerous flora and fauna surveys, as well as accumulating thousands of casual observations of species localities. To allow the rapid retrieval of these data, a series of computer databases have been implemented. Some of these databases act as libraries of standard terms and definitions, while others hold the field data themselves.

The databases

"CAVS" is a database organized around the ANPWS *Census of Australian Vertebrate Species*. It is used to look up codings for species by part of the genus, species or common name, and to update the taxonomic details in the main databases. The continued support of the ANPWS database is essential if it is to become an Australian standard for fauna coding.

"CAPS" is a similar database, except that it

deals with plant species. Codings are looked up by the first four letters of the genus and the first four letters of the species.

"ALSH" contains the codings for the *Australian Soil and Land Survey Handbook* (McDonald *et al.*, 1984), plus some additional codings specifically used within NPWS (e.g. reserve and district codes). These are used to validate data entry in the main databases.

"ROTAP" contains records of rare or threatened Australian plants. Records have been collected in collaboration with CSIRO and the Royal Botanic Gardens Sydney, and contains both specimen-backed and field records. These records are used to prevent accidental destruction of rare plants, and to assess threats to different species or populations.

"Atlas of NSW Wildlife" contains the point locality records of fauna and non-ROTAP flora. Basic details, plus spatial and taxonomic accuracy, are held. These records can be subdivided and loaded into graphic Geographic Information Systems for further analysis, such as distribution or habitat modelling.

"Survey" contains field data from vegetation surveys. Data structures are such that files for "PATN" analysis and modelling are easily generated. Results for each survey are stored separately, and are transferred into the "Atlas of NSW Wildlife" at completion.

Reference

McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J., and Hopkins, M.S. (1984) *The Australian Land Survey Field Handbook.* Inkata Press, Melbounre.

COMMENTARY

Further applications of the data enrichment method

I read with interest Dr Morrison's article "A new method for increasing the robustness of cladistic analyses" (*Austral. Syst. Bot. Soc. Newsletter* 71: 2-5), and felt that this technique could be applied to other aspects of systematics, and not just restricted to cladistics.

As Dr Morrison points out in his conclusions, "we can increase the size of our data matrices without recourse to the difficulties inherent in the empirical method." In other words, with this new method, it will no longer be necessary to conduct extensive field studies; all we have to do is use the specimens already housed in herbaria. We then apply the Data Enrichment Method, and where before the sample size was too small to do effective phenetic analyses, it will now be quite large enough, and that "undescribed" taxon will be more obvious in the dendrogram or ordination plot.

Our large funding bodies will also approve of this new method, when considering the current economic environment, because grant applications will no longer need to budget for expensive field trips. With smaller grant budgets, there will no longer be any excuse for not funding more of the projects. In the university system, where promotion and tenure relies so heavily on the "publish or perish" regime, it will now be much quicker for the researcher to obtain data using this method. It will therefore be easier to produce more publications. The end result, of course, is happier funding bodies, muffled university administrators, and financially sound taxonomists.

Peter Jobson
Department of Botany
James Cook University of North Qld

Proposed revisions to the International Code of Botanical Nomenclature

One of the features in which the *International Code of Botanical Nomenclature* (Lanjouw *et al.*, 1966) contrasts with its zoological counterpart is the requirement of a Latin diagnosis for the valid description of a new species (Article 36). The most useful function of this requirement is the obstacle that it presents to the description of new species by the average young taxonomist, who is not completely at ease in the use of this learned tongue. However, judging from the current taxonomic literature, this discouragement is not sufficient. It is still easier to describe a new species than it is to search for the correct identification among the all

too numerous species previously described. With this situation in mind, we propose the following additional features to the Code.

To follow Article 36 (add 3 to the serial numbers of the present Articles 37 ff.):-

ARTICLE 37

The name of a new taxon of specific or lower rank is not validly published unless the author has conducted field work in the type locality for at least five years.

RECOMMENDATION 37A

The author should remain resident in the general area of the type locality for at least two more years, in order to assist students and others in finding and identifying populations of the new taxon.

ARTICLE 38

Before the name of a new taxon of specific or lower rank is validly published, a second collection of this taxon, either from a different area or in a different year, must be made. The date of effective publication of the name of the new taxon is the date of publication of the report of the second collection.

RECOMMENDATION 38A

The second collection should be made by a different person, and preferably by a person of a different organization, from the collector of the type specimen.

ARTICLE 39

A person publishing the name of a new taxon of specific or lower rank thereby constitutes himself an authority on all related taxa. He must, on demand, explain the morphological difference between the new taxon and any other validly named taxon in any part of the world.

RECOMMENDATION 39A

Any author who fails to satisfy a mutually acceptable arbitrator by his response to a challenge is expected to commit suicide by some appropriate manner, such as drinking formalin or fumigating himself.

RECOMMENDATION 39B

Any author who describes a new species should be able to convince his first year biology students that it conforms to his definition of a species as a biological entity.

RECOMMENDATION 39C

Publication of the names of new taxa may be a tempting way for junior faculty members to increase their bibliography. Therefore, we recommend that university tenure committees:- (1) dismiss any faculty members who publish taxonomic papers which devote more space to the description of new taxa, or to nomenclatural changes in old established ones, than to providing more information about taxa with names already validly published; (2) give favourable consideration for tenure to taxonomists who avoid publishing anything for seven years.

The authors realize that these proposals might more appropriately be made in *Taxon* than in *The Journal of Irreproducible Results*, but we hope to get a quicker publication this way.

Reference

Lanjouw, J., *et al.* (eds) (1966) *International Code of Botanical Nomenclature adopted by the Tenth International Botanical Congress, Edinburgh, August 1964*. International Bureau for Plant Taxonomy and Nomenclature of the International Association for Plant Taxonomy, Utrecht. 402 pp.

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Thomas B. Widdowson and Louis D. Druehl
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When Albert Szent-Gyorgyi submitted his discovery of vitamin C to the journal *Nature* he named it "ignose", as it was a sugar of unknown composition. However, this term was rejected by the editor of the journal on the grounds of flippancy. Therefore, zent-Gyorgyi sent back his paper with the compound renamed "godnose".

A.S.B.S. Inc. BUSINESS

Fifteenth General Meeting

The 15th General Meeting of the Australian Systematic Botany Society Incorporated will be held on 20 January 1993 at the University of Tasmania, Hobart, Tasmania, in conjunction with the "Southern Temperate Ecosystems: Origin and Diversification" conference (18–22 January 1993).

Any member wishing to place an item (or items) on the agenda should notify the Secretary (Dr Barry J. Conn) in writing by 13 January 1993.

Council Elections

In accordance with the Constitution of the Society, nominations are called for all positions on the Council for the 1993–1994 term of office:- President, Vice-President, Secretary, Treasurer, and two Councillors.

Barry Conn, the current Secretary, having served four consecutive terms on Council as Secretary, is ineligible to continue in that position. All of the other office-bearers are eligible for re-election.

Each nomination must be proposed by two members, and the nominee's acceptance of the nomination must accompany the nomination itself. Nominations must be on the form enclosed in this *Newsletter*, or on a facsimile of same. All nominations must be in the hands of the Returning Officer (Dr Barry J. Conn) by 25 November 1992.

Barry Conn
Secretary, ASBS Inc.

New Public Officer

Councillor Jeremy Bruhl has taken up a new appointment as lecturer in botany at the University of New England. We wish him well in his new job — we expect to see sedgologists pouring out of there in the near future.

As a result of his departure from Canberra, Council has appointed a new Public Officer of ASBS Inc. The Public Officer must be a resident of the A.C.T., and is responsible for seeing that the Society complies with the laws and regulations under the A.C.T. Associations Incorporation Act. In practice, this means lodging relevant documents with the A.C.T. Registrar, such as annual financial statements, changes to the Constitution and changes to Council.

The new Public Officer is Andrew Lyne. Andrew is a technician in the herbarium at the Australian National Botanic Gardens. He has a research interest in Myrtaceae, especially the *Leptospermum brevipes* complex, on which he is undertaking postgraduate study.

M.D. Crisp
President, ASBS Inc.

CSIRO Scientific Journal Subscriptions

Those members who subscribe to the CSIRO journals through the Society, and thus pay the concessional price, are reminded that their subscriptions are due at the beginning of November. These people should contact the Treasurer (Dr D.J. Bedford) regarding the current prices.

David Bedford
Treasurer, ASBS Inc.

A.S.B.S. Member Profiles

David Bedford
A.S.B.S. Treasurer

David was born in far north Queensland, in a little town called Mareeba, on the dry edge of the Atherton tableland. The son of a civil engineer and a nurse, as a child David was imbued with a desire to emulate some of his maternal relations and be a

drover. But it was not to be, as his parents moved when David was only two years old to a construction site on the Little Nerang River in south-east Queensland. After some years in the lush bushland surroundings, and starting school (copperplate handwriting on a slate was a speciality), David moved again, to West Pennant Hills in Sydney. Here he learned to write in cursive, and live in a suburban subdivision in the bible-belt. It was at this stage that the first signs of a love of botany emerged, when David found himself objecting to other little boys chopping down saplings with their tomahawks.

From there the family moved further southwards to Canberra. David attended Canberra Grammar Primary school, where he learned to write in italics, before graduating to Canberra Grammar High School, and degenerating to a combined-style writing scrawl. Grammar being a traditional school, students were "streamed" on the basis of their performance, and David was placed in the "Latin" stream, which meant he was not allowed to do practical things like farm mechanics. This probably explains why he has taken up practical hobbies like conserving antique furniture and other such work.

After the HSC, David went to the A.N.U. Careers Advisory service to find out what to do next. On completing an aptitude test, he was told that he had scored the lowest possible for clerical work (note that) and very highly on science. David then moved to Brisbane, to rejoin his parents who had moved back there the year before. He enrolled in a general science degree at the University of Queensland, with the intention of becoming a psychologist specializing in nerve system studies.

However, zoology revolted him ("there's an animal, quick, kill it, pickle it in formalin for 3 months, then we can cut it up and look at its structure"), chemistry was incomprehensible, and psychology was so unchallenging and simplistically-presented that it bored him (it specialized in the history of psychology, rather than examining and explaining behaviour, and even had final exams with multiple-choice questions). This left botany, which was taught in an interesting and enthusiastic way, and actually involved dealing with living things! This enthusiasm lasted the distance through honours and into the beginning of a Ph.D. on *Xanthorrhoea*, before David's peripatetic history re-asserted itself and he had to move on — to a Ph.D. on *Xanthorrhoea* in Sydney.

After two more years, and believing he would complete his thesis in a couple of months, David opted for full-time work, and took a position at the National Herbarium of New South Wales, Royal Botanic Gardens Sydney. Finding work somewhat more involving than he had anticipated, the thesis went onto the back-burner while David got on with the job, which state of affairs went on for rather a long time.

David has general interests in studying and conserving the plant world. His main botanical research to date has been on *Xanthorrhoea* — the slow growth, cryptic nature of taxa, and taxonomic complexity of this distinctive group of plants has proved a worthy adversary. Other research and speciality areas include: computerisation, especially herbarium databases, materials conservation, and archival techniques.

David's career in botany has been shared with a developing interest in management, which is quite definitely not the way he intended. Originally convinced that he would be best as a "back-room researcher", he now spends most of his time as a front-line scientific administrator, which he finds has its satisfactions (though he sometimes feels this is rather too close to his lowest aptitude score).

David is very happily married, and is an adoring father of two children. His hobbies, when he has time for them, include sailing on Sydney harbour, photography, collecting Australian antiques (especially furniture), and identification of timbers.

Southern temperate ecosystems conference

The organization of this conference, from January 18–22 1993, is well under way. This is a reminder that the due date for registration is the end of October 1992, after which there is a late fee.

Publication of the proceedings has been finalized. There are organized field trips to Mount Field National Park, both before and after the meeting. There is a large international contingent registered, especially from New Zealand, South America (Argentina and Chile), and North America. Prof. Mike Archer is giving the public lecture.

For further information, contact Bob Hill:-

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Bob Hill

REPORTS

Australian Botanical Liaison Officer

This issue's ABLO report has been delayed, as Philip Short has had glandular fever and his own wedding to occupy his thoughts. An account of his recent ABLO activities will appear in the next issue. This will also incorporate a report from the new ABLO, Peter Weston.

Australian Biological Resources Study

The ABRS Advisory Committee met on 6–7 August. Its recommendations for grants in 1993 are currently with the Minister for approval.

Tony Orchard took up duty with the Flora unit on 13 July. Paul Hattersley has returned to the fold from the Scientific Audit Unit of ANPWS. Jane Mowatt's secondment to assist editing the *Flora* has been extended for a further twelve months.

Volume 35 (Brunoniaceae and Goodeniaceae) of the *Flora of Australia* was published on 6 August, being formally launched by the Minister for the Arts, Sport, Environment and Territories. The first volume on lichens, *Volume 54*, is to be launched at the Symposium of the International Association of Lichenologists in Bästad, Sweden, on 4 September.

The Algae Workshop was held at the National Herbarium of Victoria on 9 and 10 June. Its report and recommendations will go to the Flora Editorial Committee for discussion at its 1992 meeting, scheduled for 15-16 September.

In June, Alex George attended a meeting of the Checklist Committee of IOPI in Leiden, and spent a few days in London, mainly to discuss contributions to *Volume 54* from the Natural History Museum. Alex will attend the IOPI meetings in Xalapa, Mexico, in November. Cheryl Grgurinovic is currently attending the Lichenologists' Symposium in Sweden, after which she will attend the European Mycological Symposium at Kew. In September, Helen Hewson will attend the second Flora Malesiana Symposium in Jogjakarta, Indonesia.

Our address is:-

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Alex George
Flora of Australia

International Organization for Plant Information

The Checklist Committee met in Leiden on 15 and 16 June and prepared a Draft Project Plan as well as making progress on several issues, in particular the Taxonomic Resources Network. The Royal Botanic Gardens, Kew, has set up a Co-ordinating Centre for the Checklist, headed by Dr David Hunt.

The next meeting of the Organization will be held in Xalapa, Mexico, from 3 to 5 November 1992, immediately preceding the next meeting in the same city of the International Working Group on Taxonomic Databases for Plant Sciences

(TDWG). All of IOPI's Working Groups as well as the Council and Checklist Committee, will hold meetings there, prior to a Plenary Meeting and General Meeting. Registration is $US100. Anyone or any institution wanting further information, or wishing to apply for membership, should contact the Secretary:-

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Australian Biological Resources Study,
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Alex George
Flora of Australia

International Transfer Format — an update

At the last executive meeting of TDWG in Washington (March 1992), the need for a revision of the International Transfer Format (ITF) was recognized. Recent correspondence with Diane Wyse Jackson (Information Systems Officer, Botanic Gardens Conservation International) indicates that the BGCI is "aware that a review [of ITF] should be initiated, and that [it] is one of the subjects at the Computer Workshop in RIO during the 3rd International Botanic Garden Congress." The BGCI is considering "variable length fields, cultivation methodologies and maintenance programs, plant economic uses and the need for recording non-typical ex situ collections."

Although Diane assures me that there has been "good interactive discussion", I suspect that Australians have not played a very large part in these. There is an urgent need for the review process of ITF to be more public, so that comments can be received from all interested parties. I urge all Australian botanic gardens and herbaria to request active involvement, to ensure that the BGCI does not forget the "International" in ITF or in BGCI!

The address of the Botanic Gardens Conservation International is:-

Descanso House,
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Richmond, Surrey TW9 3BW
UK.

Barry Conn
TDWG Regional Secretary (Australia)

ASBS participation in AIBS meetings in Hawaii

The 43rd Annual Meeting of the American Institute of Biological Sciences was held in Waikiki on 9–13 August this year. The AIBS meeting is an umbrella conference bringing together the meetings of some 13 associations and societies.

For this year's conference, given its greater proximity to Australia, ASBS was invited by the Botanical Society of America to participate in a half-day symposium entitled "Biogeography and Phylogenetics of Pacific Flora". This symposium was co-sponsored by the National Botanical Garden, Kauai. As it turned out, all siz of the participants in this symposium represented ASBS.

The sympsoium was chaired by Judy West, and consisted of the following papers:-

Bryan Barlow, Australian National Herbarium — "Loranthaceae: rare Pacific waifs"

Phil Garnock-Jones, Landcare Research, N.Z. — "Phylogeny of the southern veronicas (Scrophulariaceae)"

David Murray, University of Sydney — "The application of seed protein electrophoresis to questions of phylogeny"

Peter Wilson, National Herbarium of NSW — "Phylogenetic analysis of *Metrosideros* and its allies (Myrtaceae) in the Pacific region"

Chris Puttock, University of NSW — "Cladisitc analysis of the Gardeniese (Rubiaceae) of the Pacific region"

Judy West, Australian National Herbarium — "Diversity and phylogeny of *Portulaca* in the tropics"

The speakers were very grateful for financial support received from the National Tropical Botanical Garden. This generous gesture enabled them to get to the conference and contributed greatly to the success of the meeting.

Peter Wilson
National Herbarium of NSW

J.B.S. Haldane has described the normal process of acceptance of a scientific idea as having four stages:-

(i) this is worthless nonsense;
(ii) this is an interesting, but perverse, point of view;
(iii) this is true, but quite unimportant;
(iv) I always said so.

REVIEWS

Introduction to the Principles of Plant Taxonomy. Second edition.

By V.V. Sivarajan (edited by N.K. Robson). Cambridge University Press, Cambridge. 1991. xiv+292 pp. ISBN 0-521-35679-2. $55.

This review continues the series started in earlier issues of the *Newsletter* (**70**: 30-33, **71**: 32-36), assessing the ability of the current crop of plant taxonomy textbooks to present systematics as an exciting modern science, rather than an simply a traditional scholarly exercise.

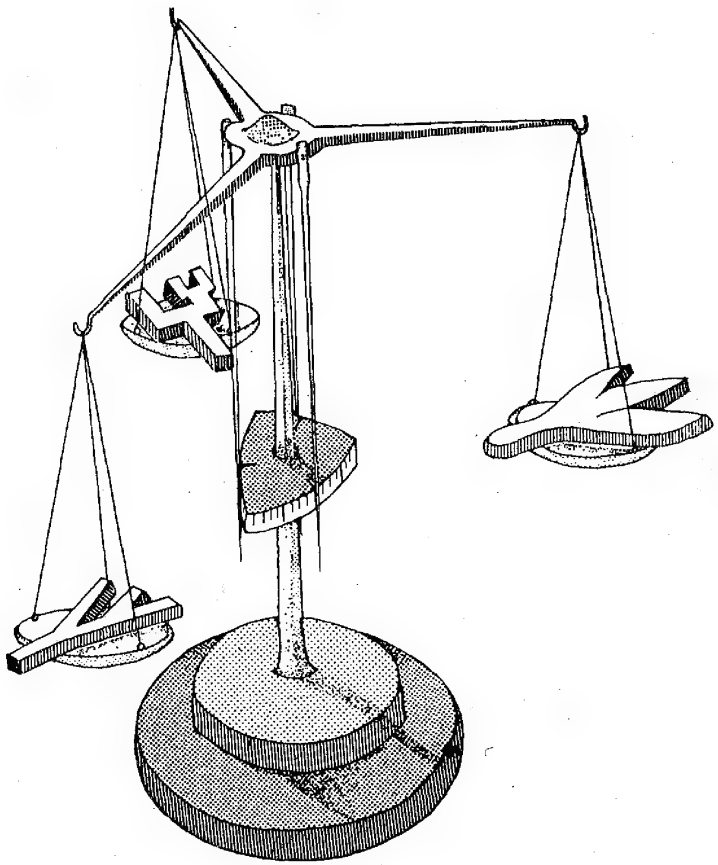
This book by Sivarajan is explicitly aimed at university undergraduate and postgraduate students undertaking a subject covering plant systematics. It would be completely unsuitable for the general public, as it assumes a fair knowledge of introductory biology, and it is probably even beyond the needs of general botany graduates. As such, it should be expected to meet the criteria specified for this series of reviews, and indeed it does to a large extent. However, there are notable lapses, as we shall see.

The book is a revised version of one originally produced and published in India in 1984, which was reasonably well-received at the time. It has been updated by the author, and then edited by Norman Robson. It is organised into 9 chapters, plus an Epilogue — there are no appendices or other extraneous matter. There are no family descriptions, no list of terminology, and almost no illustrations or tables — this is dense theoretical text from beginning to end. The index is comprehensive enough, including all taxonomic names, and the bibliography is very extensive and mostly up-to-date, being certainly the best of the books reviewed so far. The examples chosen are extremely cosmopolitan, covering all continents (but favouring the northern hemisphere), which is a refreshing change from the parochial books reviewed last time.

Unfortunately, this is the worst-presented scientific book that I've ever seen. I don't even know where to start in describing its presentation, and the publishers should be ashamed of themselves for releasing such a low-quality paperback at this price. Perhaps I could start by pointing out that the editor goes under several names — he is "N.K.B." Robson on the front cover and in the References, but "N.K.P." Robson on the title page and its reverse. This is fairly typical of the rest of the book — if you can't find a mistake of some sort on any one page it's only because you're not looking hard enough. Mistakes range from a rather random number of lines of text per page (some pages end within a few millimetres of the bottom margin) to unexpected uses of English words (the suggestions of the reviewers of the earlier edition are described as "lucrative"), from huge sentences without apparent punctuation to incorrect (or missing) reference citations, from minor typographical errors to inconsistent author abbreviations (Linnaeus goes from "L." to "Linn." in the middle of the very chapter on nomenclature), and from ever-changing spelling to wrong figure references. The list goes on. Scientific books are expensive enough as it is, if for no other reason than the usually small print runs, but this book shows a contempt on the part of the publisher that is beyond the pale. No-one should be expected to pay such a large amount of their hard-earned money for such poor quality — the release of this book is inexcusable.

Nevertheless, the content of the book is the main focus of this review. The aim of the book itself is stated unambiguously several times in the Preface and in the Foreword. For example (page xiii): "In most of our universities what is being taught in the name of the subject is the detailed characters of families specified by the curricula with a number of examples of plant species often not known to the students, thus forcing them to cram hundreds of Latin names without knowing exactly what they refer to. Principles of taxonomy usually get a rough deal in the class rooms. This has eroded the credibility of the subject to a very great extent, often giving the impression that it does not have a sound theoretical foundation and that it means nothing more than telling the names of plant species. As a result, botanists have been fleeing to greener pastures, more fashionable fields of botanical studies, reducing plant taxonomy into an 'esoteric' area of plant research."

Unfortunately, no-one is likely to be attracted to the science of plant taxonomy by this particular book — only pig-headedness got me to the end of it. The book is about the principles (rather than the practice) of systematics, and as such it is a fairly dry and unrelenting exposition of the topic. I read a number of other books between when I started this



The balance of systematics. From Sivarajan (1991).

one and when I finally finished it (including the two books that I reviewed last time), and most of them were much more interesting to read than this one. The writing style is neither pedantic nor otherwise annoying — it is simply relentlessly dry and theoretical. Systematics is interesting as well as scientific, but if the author has any enthusiasm for his subject then he keeps it well hidden.

Nevertheless, the actual content of the book has much to recommend it, although in places the author's personal preferences and opinions overly dominate the discussion. The book starts well, with the Introduction (14 pages) covering the importance and aims of taxonomy simply and effectively. However, no actual "principles" of plant taxonomy are ever enumerated, which belies the title somewhat. Chapter 2 (10 pages) is an interesting history of The Evolution of Theories of Biological Classification, which is certainly not covered in the other books reviewed so far. If nothing else, this chapter provides a lucid exposition of several relevant topics that many taxonomists tend to hide from.

Chapter 3 (39 pages) covers some of the Problems in Evolutionary Taxonomy. This starts well, providing good coverages of the vexing problems of primitive and advanced characters, monophyly and polyphyly, parallelism and convergence, and homology and analogy. The author has clearly followed the current discussions of these topics closely, and he summarizes the current state of the debates effectively.

However, the section entitled "The theoretical basis of plant classification: a critical evaluation" is the section in which the author's own prejudices intrude most. The presentation of cladisitcs, for

example, is often misleading, as it cites some questionable statements by some of its proponents as being generally accepted by all cladists. It also ignores the relative ability of the different methodologies to retrieve information from their classifications, and even ignores the relative testability of those classifications. Ultimately, the author seems to find the cladistic arguments theoretically convincing, but he can't quite bring himself to become one in practice. He eventually concludes that phylogeny and taxonomy are incompatible: "Evolutionists would do well to confine their investigation to the evolutionary processes and products, leaving the problems of classification and concepts of taxa to the taxonomists". So, classification becomes merely a pragmatic exercise of trying to intuitively incorporate all of the available data: "The intuitive taxonomist's view, that the power of the human intellect in recognising gestalt as homology and synapomorphy will thus still remain the basis of professional taxonomist's practice, seems to be true." This is tantamount to saying that taxonomy can never be a science.

Chapter 4 (22 pages) is a generally good coverage of The Historical Development of Classificatory Systems, although cladists are described as "the extremists among evolutionary taxonomists", cladistic systems are described as "monothetic", and all recent classification schemes emerge as merely minor modifications of that by Takhtajan. Chapter 5 is an aside (4 pages) on Taxonomic Structure, which could easily have been the introduction to the next chapter.

Chapter 6 (24 pages) discusses Concepts of Taxa, mainly species but including genera and families. The comparison of the various species concepts is generally good, but some of the arguments against particular concepts depend very much on personal points-of-view. Unfortunately, at the higher taxonomic levels the author prefers pragmatism to sound theoretical foundations, and the principles expounded in the Preface don't make it past page 110: "protagonists of this strict genealogical definition of taxa seem to forget that, for people who use this system, the greatest need is to identify, remember and communicate, and that philosophical purity is of no consequence unless it is tempered by dictates of practical convenience and common sense."

Chapter 7 (23 pages) details The Material Basis of Systematics, including characters, speciation and isolation mechanisms. Unfortunately, this is often just a repetition of textbooks from the 1970s, rather than being an up-to-date and critical summary in the vein of the other chapters. Even the other books that I've reviewed mention punctuated equilibrium, for example.

Chapter 8, covering Sources of Taxonomic Characters, is the largest chapter (61 pages) and the most boring. It is really just a brief discussion of each of seemingly endless examples of published uses of the various character types (morphology, anatomy, palynology, embryology, cytology, phytochemistry), rather than a comprehensive synthesis and overview. Furthermore, the discussion of DNA and RNA is very out-of-date for a book published in 1991. However, the chapter ends with a section entitled "Modern systematics: the synthesis unachieved", which gives short shrift to any dichotomy between experimental taxonomy and classical taxonomy. However, the author does this by trying to denigrate experimental taxonomy, rather than by highlighting the changes that have occurred in classical taxonomy in the last 20 years. He considers that: "the 'experimental' aspect of taxonomy was obviously part of the 20th century attempt to transform taxonomy into a 'science', since experimentation is widely (and incorrectly) considered to be a *sine qua non* scientific procedure". Any attempt to turn classical taxonomy into a science seems to me to have its heart in the right place, however misguided the actual attempt.

Chapter 9 (20 pages) is a clear and sensible discourse on Plant Nomenclature, although there are so many typographical errors that I'm not sure how much use it would be to the uninitiated, and the names of varieties are treated as quadrinomials. The practical nature of this chapter also seems somewhat out-of-place with the conceptual issues discussed in the rest of the book.

The book ends with a short (5 page) Epilogue, which considers the current status of plant taxonomy: "My purpose here is only to inspire a soul-searching among ourselves, to understand why taxonomy has come to such a pass." This is my favourite part of the book, although I don't agree with all of what it contains, nor do I think that it covers all of the topic. Still, the author is revealed to be a human being after all, and he really does care about his subject. I would love to quote from it at length, but that must await another day.

In the final analysis, the content of the book doesn't really live up to its promise. There are too many conflicting ideas about what constitutes a science in the different chapters, and pragmatism comes to the fore in too many places for me to be able to recommend this as an effective introduction to plant taxonomy as a modern scientific enterprise. Taxonomy is certainly seen to be more than just biological identification, and more than just a schol-

arly exercise; but the excitement that the current methodological debates and new techniques should generate is completely absent. Perhaps the problem is that it's generally only older people who have the breadth of knowledge and inclination to write a textbook, while it's generally only the younger people who are able to generate and maintain the necessary enthusiasm; the combination is rare indeed.

David Morrison
Department of Applied Biology
University of Technology, Sydney

Vegetation Description and Map, Ipswich, South-eastern Queensland. Scale 1:250,000.

By James A. Elsol. Queensland Botany Bulletin No. 10, Queensland Department of Primary Industries, Brisbane. 1991.

In this publication, the vegetation of the Ipswich 1:250,000 mapsheet is mapped and reported upon, together with a description of the data collection methods.

Vegetation mapping is important and necessary for our understanding of the natural environment, and hence for the proper management and conservation of our remaining naturally-vegetated lands. People who possess the necessary skills in ecology, botanical taxonomy, remote sensing interpretation, and drafting to produce good vegetation maps are rare and valuable. It is important that such expertise is employed to produce relevant end-products which convey to the user a clear and concise picture of the resource with which they are dealing.

In the report, the author has described some 33 vegetation "communities", which appear to approximate alliances. These have been loosely grouped into 14 "types", and each vegetation type/sub-type is described in the following terms:-

- frequency class of all tree species recorded
- basal area of stems for the main tree species, expressed as a percentage of the total and as m^2/ha
- a list of all of the small tree, shrub, herb, grass and vine species encountered for the type
- the main locations, altitudinal range, geological types, and aspects for the type/sub-type.

Each type/sub-type is named for the dominant species, and is classified as open-forest, woodland, etc. according to Specht's system.

The vegetation types have been variously grouped to form 17 mapping units, although the exact relationship between type and mapping unit is not made clear in the report. For example, mapping unit No. 1 is dominated by vegetation types 1B, 1E and 10A, with minor occurrences of types 1A, 1F, 5, 6B and 6D. The map reference, however, is clear, and unambiguously lays out the main tree species, the range of species per site for the unit, and the major geological types associated with the unit. The map is in three colours, and groups "open-forest", "woodland" and "closed-forest" types by colour.

There are, however, in my opinion, some important shortcomings of this map and report.

The map purports to be a representation of the vegetation in an "undisturbed pre-European condition." Surely, any vegetation map produced today must be primarily concerned with the resource as we find it *now*. Any land manager (public or private) will be severely frustrated when using this map, which provides no indication of where the native vegetation now occurs. It also appears to me to be very ambitious to claim to be mapping the vegetation in a pre-European condition. I do not believe that we know enough about the pre-grazing, pre-weed, pre-feral animal condition of the vegetation to be able to make such a claim.

The report contains sections describing both survey and analysis methodology. However, unless the reader is already familiar with these methods, the report is not very informative, and leaves the reader needing to consult a long list of references. For example, the survey method discussed is based on dimensionless plots in which the basal area of the tree stems is estimated using either the "clump-point" or the "Bitterlich" methods (relevant references are given) without any rationale for, or description of, these techniques.

There is also nothing in the text to indicate how the projective foliage covers necessary for Specht's classification were derived from these methods, assuming that they were so derived. Added to this, the method seems to have taken no account of vegetation community structures and diversities. This information is important if the map is to be used by land managers, particularly those concerned with species conservation.

Dominic Sivertsen
NSW National Parks & Wildlife Service

Pioneer Priest and Botanist. Benedetto Scortechini.

By Patrick J. Tynan. Church Archivists' Society, Qld. 1989. 183 pp. ISBN 0-949122-08-4. $15.

This is an interesting small book about one of the botanical collectors perhaps not widely known.

It starts with some general history of the districts of Warwick, Gympie and Logan in Queensland, with some emphasis on the work of the catholic parishes. There is also much drama in Father Scortechini's pastoral duties, his willingness to help his parishoners leading to an attempt on his life, and his love for botany eventually leading to his death.

There is a good lot of photographs of both priests and botanists, with several appendices on Scortechini's botanical publications, and further information on the attempt on his life. The photographic reproduction gives a clear printing, but the photographs could be improved.

This book is available from the Church Archivists' Society, P.O. Box 756, Toowoomba, Qld 4350. I was glad to have this book as a present from my wife, Thelma.

Syms Covington of Pambula.

By B.J. Ferguson. Merimbula-Imlay Historical Society, N.S.W. 1981. 36 pp. ISBN 0-909598-03-7.

Syms Covington was the assistant to Charles Darwin on the voyage of *H.M.S. Beagle* 1831–1836. He was not a botanist, but this brief biography of an interesting man who worked with Darwin should be of general interest to many scientists.

Covington migrated to New South Wales in 1839 or 1840, bearing a personal letter of recommendation from Charles Darwin, and maintained correspondence with him.

Covington's home in Pambula still exists, and has been classified by the National Trust.

George Chippendale
Canberra

NOTICES

Proposed taxonomic databases meeting

Preliminary notice of a workshop

We are proposing a workshop/meeting on taxonomic databases for biological data in spring 1993.

We also propose to hold a preliminary discussion and planning meeting during the "Southern Temperate Ecosystems" conference at the University of Tasmania in January 1993, to plan the agenda of the main workshop and form an organizing committee. We hope for participation from institutions as well as individuals. The Western Australian Herbarium and the Australian Biological Resources Study will be participating. The preliminary planning and discussion meeting in Hobart is arranged for 2.00 p.m. wednesday 20th January 1993.

Possible topics for the main workshop include:- Databases currently available or under development; Data formats and software; Prospects for standards and co-operation; Whole flora or fauna approaches; Linking different kinds of databases; Public access and public release (published) systems; Current and future technology; and Demonstrations of systems.

The proposed workshop will probably be held in conjunction with the planned Australian Systematic Botany Society symposium in Perth at the end of September 1993.

Indications of interest in attending the proposed meetings will be welcome. Please contact one of the following:-

Alex Chapman
Western Australian Herbarium
Tel (09) 367-0513
Fax (09) 367-0515
Nicholas Lander
Western Australian Herbarium
Tel (09) 367-0487
Fax (09) 367-0515
Terry Macfarlane
Conservation & Land Management
Tel (09) 71-1988
Fax (09) 71-1855
Paul Hattersley
Australian Biological Resources Study

Tel (06) 250-9444
Fax (06) 250-9448

Terry Macfarlane
W.A. Dept Conservation & Land Management

Conserving biodiversity: threats and solutions

Preliminary notice of a conference to be held at the University of Sydney 29 June – 2 July 1993

The New South Wales National Parks and Wildlife Service will host a four-day conference on the conservation of biodiversity. The conference will be held at the University of Sydney as part of the 25th Anniversary of the Sevice.

The conference will focus on threats to biodiversity (natural species and systems). It will review the impact of these threats and the range of solutions available to counter them, to ensure the conservation of wildlife into the next century.

The aim is to define a framework for action, ranging from practical management in the field, to planning and legislative requirements needed to sustain biodiversity in the 21st century.

Invited prominent Australian and overseas speakers will present papers on the following topics:- Why conserve biodiversity?; Habitat loss and restoration; The impact of exotic plants and animals on biodiversity; Pollution and degredation of water resources; Changes to fire and climate; Ecologically sustainable exploitation of biodiversity; and Can governments solve the problems?

Display space for poster papers will be available at the conference.

If you are interested in submitting a poster paper or would like to receive registration papers, please contact:-

Lynda Wild,
Conference co-ordinator
NSW National Parks & Wildlife Service
P.O. Box 1967
Hurstville, NSW 2220

Tel (02) 585-6417

Lynda Wild
NSW National Parks & Wildlife Service

Help sought

I am undertaking an ecological study of the *Senecio lautus* complex and the introduced *S. madagascarensis* in New South Wales, along with Roger Cousens.

At present, the information that we have on the *S. lautus* group is limited, and mostly concerns its morphology/taxonomy. The morphological variability within the complex is great, as outlined by Peter Michael earlier in this issue of the *Newsletter*, but the degree of genotypic differentiation is still not fully understood. This has lead to confusion about the extent to which groups are genetically or ecologically isolated. This uncertainty is further hampered by incomplete locality and habitat data from herbarium specimens, as well as the lack of fully-representative herbarium and seed collections.

We will be studying the ecology and population dynamics of the various ecotypes of *S. lautus* in New South Wales. We will also grow them in the glasshouse, along with collections from other parts of Australia, to determine the degree of genetic variation. In addition, we would like to generate distribution maps of the ecotypes.

We are seeking people with knowledge of *S. lautus* anywhere in Australia. In particular, we are after seed collections, voucher specimens of plants, and incidental information about its ecology/phenology anywhere in Australia.

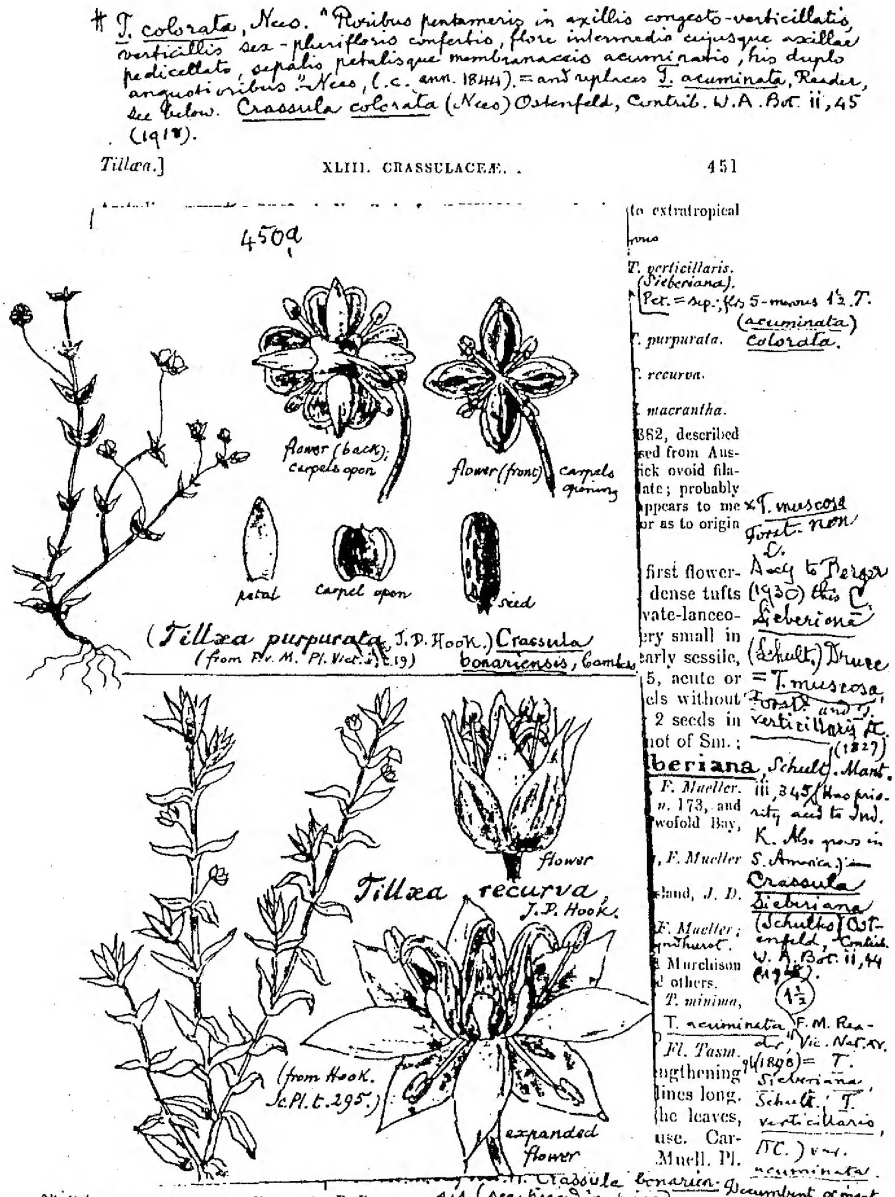
Anyone willing to participate or contribute their knowledge should contact:-

Ian Radford or Roger Cousens
Applied Plant Ecology Research Unit
University of Sydney, NSW 2006.
Tel (02) 692 2946 or (02) 692 2529
Fax (0) 692 4172

Ian Radford
University of Sydney

University Chancellor:- Why is it that you physicists always require so much expensive equipment? Now the Department of Mathematics requires nothing but money for paper, pencils, and erasers ..... and the Department of Philosophy is better still; it doesn't even ask for erasers.

Annotations by J.M. Black in *Johnson's Gardeners Dictionary* (1898) by Wright and Dewar, page 4. Apparently an early effort at hand printing.



A typical inter-leaving (originally in watercolour) with marginal notes by J.M. Black in *Flora Australiensis Vol. 2* (1864) by George Bentham, page 451.

Alligator, n. The crocodile of America, superior in every detail to the crocodile of the effete monarchies of the Old World. From the notches on his back the alligator is called a sawrian.

Deinotherium, n. An extinct pachyderm that flourished when the Pterodactyl was in fashion. The latter was a native of Ireland, its name being pronounced Terry Dactyl or Peter O'Dactyl, depending on whether the man pronouncing it may chance to have heard it spoken or seen it printed.

Eat, v.i. To perform successively (and successfully) the functions of mastication, humectation, and deglutition.

Edible, adj. Good to eat, and wholesome to digest, as a worm to a toad, a toad to a snake, a snake to a pig, a pig to a man, and a man to a worm.

Mammalia, n. pl. A family of vertebrate animals whose females in a state of nature suckle their young, but when civilized and enlightened put them out to nurse, or use the bottle.

Goose, n. A bird that supplies quills for writing. These, by some occult process of nature, are penetrated and suffused with various degrees of the bird's intellectual energies and emotional character, so that when inked and drawn mechanically across paper by a person called an "author", there results a very fair and accurate transcript of the fowl's thought and feeling. The difference in geese, as discovered by this ingenious method, is considerable: many are found to have only trivial and insignificant powers, but some are seen to be very great geese indeed.

Genealogy, n. An account of one's descent from an ancestor who did not particularly care to trace his own.

Pedigree, n. The known part of the route from an arboreal ancestor with a swim bladder to an urban descendant with a cigarette.

Hybrid, n. A pooled issue.

Monkey, n. An arboreal animal which makes itself at home in genealogical trees.

Australia, n. A country lying in the South Sea, whose industrial and commercial development has been unspeakably retarded by an unfortunate dispute among geographers as to whether it is a continent or an island.

Ambrose Bierce
The Devil's Dictionary

Telephone and Fax Numbers for Major Australian Herbaria

International dialling sequence from outside Australia:-
add the Australian country code 61 and omit the leading zero of the area code.

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Fax: (08) 2231809	Fax: (07) 3716655	Fax: (002) 207865	Fax: (070) 923593
CANB	CBG	MEL	NSW
Ph: (06) 2465113	Ph: (06) 2509450	Ph: (03) 6552300	Ph: (02) 2318111
Fax: (06) 2465249	Fax: (06) 2509599	Fax: (03) 6552350	Fax: (02) 2514403
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This list will be kept up to date, and will be published in each issue.
Please inform David Bedford (NSW) of any changes or additions.

The Society

The Australian Systematic Botany Society is an incorporated association of over 300 people with professional or amateur interest in botany. The aim of the Society is to promote the study of plant systematics.

Membership

Membership is open to all those interested in plant systematics. Membership entitles the member to attend general meetings and chapter meetings, and to receive the *Newsletter*. Any person may become a member by forwarding the annual subscription to the treasurer. Subscriptions become due on January 1 each year.

The Newsletter

The *Newsletter* appears quarterly, keeps members informed of Society events and news, and provides a vehicle for debate and discussion. In addition, original articles, notes and letters (not exceeding ten published pages in length) will be considered.

Contributions should be sent to one of the editors at the address given below. They should preferably be submitted as:- an unformatted word-processor or ASCII file on an MS-DOS or Macintosh diskette, accompanied by a printed copy; as an unformatted word-processor or ASCII email file, accompanied by a fax message reporting the sending of the file; or as two typed copies with double-spacing.

The deadline for contributions is the last day of February, May, August, and November.

All items incorporated in the *Newsletter* will be duly acknowledged. Authors alone are responsible for the views expressed, and statements made by the authors do not necessarily represent the views of the Australian Systematic Botany Society Inc. *Newsletter* items should not be reproduced without the permission of the author of the material.

Notes

ASBS annual membership is $25 (Aust); full-time students $12. Please make cheques out to ASBS Inc., and remit to the treasurer. All changes of address should be sent directly to the treasurer, as well.

Advertising space is available for products or services of interest to ASBS members. Current rate is $100 per full page, $50 per half-page or less. Contact one of the *Newsletter* editors for further information.

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Cover

David Mackay

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